

Pressure Pyknometry System Mark 5



A fundamental calibration method for hydrocarbon density meters

The HDF Pyknometer

The HDF Pressure Pyknometry System Mark 5 (PPS5) is designed to allow pyknometry measurements in a laboratory or on site to MI 2816.

The standard system is suitable for sampling oils with densities from 700 to 1600 kg/m³, at pressures up to 6.5 MPa and liquid temperatures from 3°C to 50°C. We can also supply systems meeting pressure ranges up to 10 MPa and temperature ranges up to 90°C.

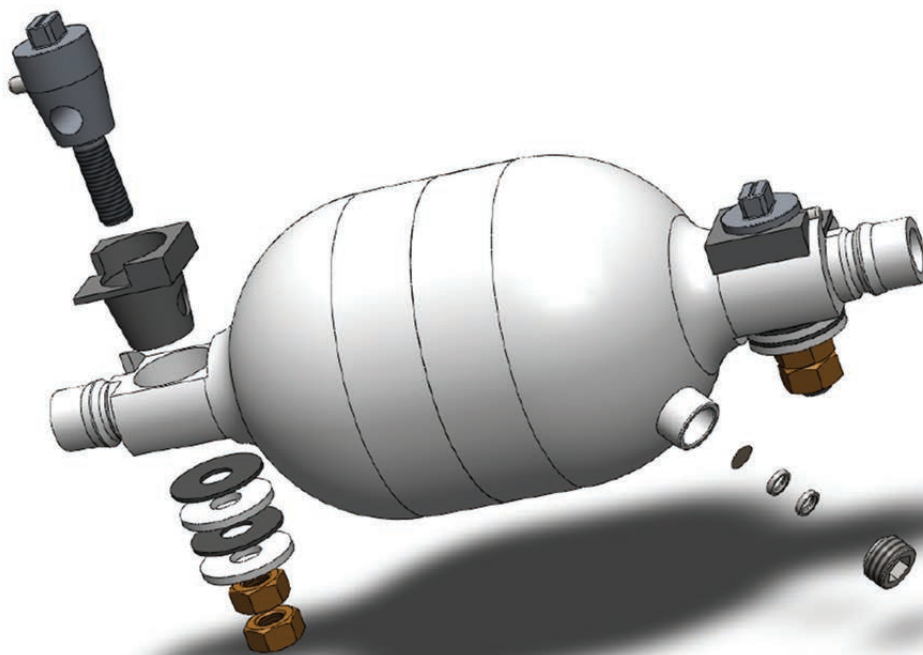
The PPS5 has GOST type approval, registered in the State Register of Measuring Instruments under 37320-08.

A pyknometer is a stainless steel pressure vessel which is used to calibrate and validate density meters for oil and oil products. Pyknometry gives direct verification of the density meter's reading and so enables very accurate calibration of the instrument in situ. Unlike secondary techniques, such as transfer densitometers, pyknometry is a fundamental calibration method which allows traceable calibration of online density meters at their online conditions.

Features:

- 11.5mm diameter valve ports to enable high flow rates through the vessel, and give rapid temperature stabilisation.
- Internal shape designed to give good mixing with no low-velocity zones. This mitigates against the collection of gas bubbles or water droplets.
- Simple, low-maintenance valves and integral quick connect ends.
- The vessel is fitted with a rupture disc to guard against the build up of excess pressure.
- Built under European PED approval.

The HDF pressure pyknometer, through its unique design, ensures accurate measurements and is simple to use.



A fundamental calibration method for oil and oil products density meters

Pyknometry is the most reliable way of calibrating density meters. It is the only calibration method which overcomes possible measurement errors such as liquid viscosity, flow rate, temperature, mounting torque, pressure, position and vibration.

The HDF Pressure Pyknometry System Mark 5 (PPS5) provides a foolproof way of calibrating crude oil density meters in situ, and is fully compliant with API Chapter 9.4.

This measurement system is capable of determining density to better than 0.1 kg/m^3 at the 95% confidence level.

All aspects of the PPS5 are calibrated and traceable to recognised national standards. A full set of calibration certificates is provided.

A fully portable calibration system



The PPS5 is fully portable for easy transport by air.

All the equipment that you need is fitted into five toughened polypropylene cases.

Item	Weight
Main System Case	21 kg
Balance Case	10 kg
Weights Case	7 kg
Hoses Case	20 kg
Pyknometer Carry Case	13 kg
Total	71 kg

All cases are water resistant, dustproof and crushproof, and can be locked for security.

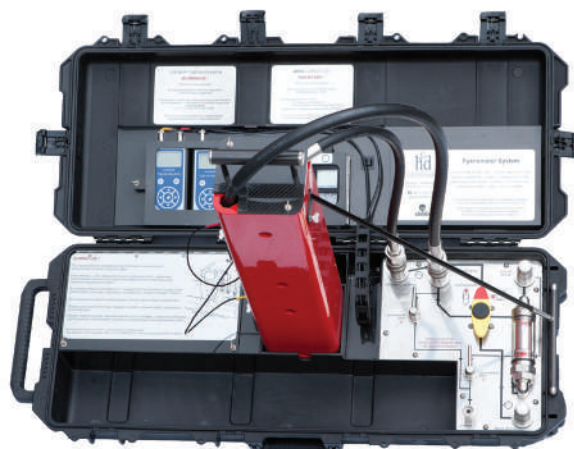
The HDF comprehensive calibration system includes:

Main System Case

The main system case is connected to the plant during sampling. It contains all the equipment necessary to collect a representative sample of oil at the same temperature and pressure as that flowing through the density meter.

Features:

- Two pressure sensors with digital displays. These units have a resolution of 0.01 bar and are intrinsically safe.
- Two dual input compact digital thermometers. One unit connects to two contact sensors in protective shoes which measure the temperature of the oil sample in the pyknometers. The other connects to two temperature probes which measure the temperature of the oil in the pipeline. Again, the units are intrinsically safe.
- A valve plate with flow indicator and self-sealing 'Dry Break' stems for connecting the hoses from the plant to the pyknometers.
- An insulated pyknometer box. This is mounted in an upright position during sampling.
- An integrated toolbox containing various tools required when operating and servicing the system, and sufficient spare parts for three years operation.



Pyknometer Carry Case

The pyknometer carry case ensures the safe storage and transport of the calibrated pyknometers when not in use.





Hose Case

The hose case contains all the necessary hoses and connectors to connect the system to the plant. All hoses have smooth PTFE liners, stainless steel braid for safety, a layer of insulating foam rubber, oil-resistant Viton sheaths, and are designed to guard against the build up of static electricity. The hoses are also equipped with 'Dry Break' connectors which are oil and gas leak-free when disconnected. An adaptor is provided to allow the hoses to be emptied and cleaned prior to transport.



Balance Case

The system is supplied with a Mettler Toledo Precision Balance. This is used to weigh the pyknometers. The balance has a working range of up to 10.1 kg with a readability of 10 mg.



Weights Case

The system comes complete with four stainless steel OIML R111 Class E2 weights (2 x 2 kg and 2 x 1 kg) which are used to calibrate the balance. These precision weights are engraved for identification and have ultra low magnetic field strength and permeability.

Traceability - Giving you confidence in your measurements

All instruments and weights supplied as part of the Pressure Pyknometry System Mark 5 are calibrated and traceable to recognised national standards held by the UK National Physical Laboratory and other National Measurement Institutes.

Each system comes with a quality manual containing calibration certificates, test certificates and a comprehensive operator manual. All documentation can be provided in Russian.



Procedure - It couldn't be easier!

Pyknometry is a simple and foolproof calibration method.

- Two empty and clean pyknometers are weighed and connected in series to the flowing oil directly downstream of the density meter to be calibrated.
- The pyknometers are then filled with a representative sample of oil at the same temperature and pressure as the oil flowing through the density meter. The system measures the pressure immediately upstream and downstream of the pyknometers so that the average value gives the pyknometer pressure.
- Once the pyknometers have stabilised at the oil temperature, the valves are closed. The pyknometers are then removed from the pipeline, the outsides are cleaned and they are reweighed.
- The oil density at density meter conditions is then calculated from the mass of oil in the pyknometers, the volume of the pyknometers at the measured temperature and pressure, and the air density.
- An independent density is calculated for each pyknometer. The two independent results can then be checked against each other, as per the GOST requirements.
- The illustrated operator manual describes this process in detailed, easy-to-follow steps.
- Pyknometry measurements made in this way ensure compliance with API Chapter 9.4 and GOST 8.024 and MI 2816.



